

REMARKS/ARGUMENTS

In this amendment, claims 1, 3, 9, and 15 are amended. No claims are added or amended. Thus, claims 1-24 remain pending.

Rejection under 35 U.S.C. § 112, Written Description

Claims 1, 9, and 15 are rejected under 35 U.S.C. 112, ¶ 1, as failing the written description requirement with regards to the phrase "*wherein at least one new test path includes every routing resource of the subset under test; and at least one other resource that was not previously coupled with that routing resource in one of the failed test paths.*" This phrase has been removed. Accordingly, Applicants respectfully request withdrawal of these rejections.

Rejection under 35 U.S.C. § 112, Indefiniteness

Claims 1, 9, and 15 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite with regards to the same phrase as above. Accordingly, Applicants respectfully request withdrawal of these rejections.

Rejection under 35 U.S.C. § 102(e), Abramovici

Claims 1, 2, 5, 9, 12, 15, 17, 21, and 22 are rejected under 35 U.S.C. 102(e) as being anticipated by Abramovici et al. (U.S. Patent No. 6,966,020; hereinafter referred to as Abramovici).

Claim 1-8, 21-24

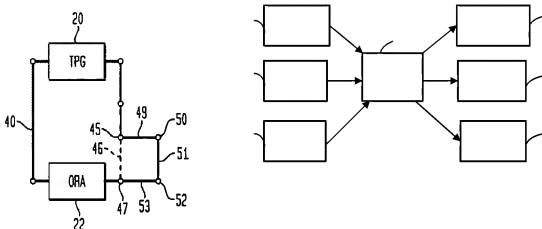
Claim 1 is allowable as Abramovici does not teach or suggest each and every element of claim 1. For example, claim 1 recites:

generating new test patterns including program bits that define new test paths for testing a first routing resource of the subset of the routing resources, wherein each of the new test paths includes:
the first routing resource; and
a combination, not included in the other new test paths, of fan-in and fan-out resources that are programmably connectable to the first routing resource,
wherein the new test paths test every combination of fan-in and fan-out resources that are programmably connectable to the first routing resource.

Support for the amendments can be found, for example, in paragraphs 30 and 34 of the present specification.

On page 3, the Office Action dated March 2, 2007 refers to Abramovici's use of fault-free resources as teaching the above limitation. *See Abramovici*, col. 8 line 60 to col. 9 line 9 and FIG. 10 (reproduced below).

FIG. 10



i. Abramovici's rerouted test paths do not include the resource being tested

To identify the specific resource that is faulty, Abramovici tests a resource 46 by using fault-free resources 49-53 to route around the resource 46. (*Id.*, col. 8 line 65 to col. 9 line 2.) The known fault-free resources 49-53 provide an alternate path around resource 46, which allows the system to determine whether the circumvented resource 46 is faulty or not. (*Id.*, col. 9 lines 2-9.)

Thus, Abramovici discloses circumventing a suspect resource in a new test path by routing around that resource. In contrast, claim 1 recites "*wherein each of the new test paths includes: the first routing resource*" being tested. FIG. 2B (reproduced above) of the present application shows test paths including the resource under test 222.

ii. Abramovici uses only one rerouted path

Abramovici utilizes one set of fault-free resources (e.g. 49-53) to test the resource 46. *Id.*, FIG. 10. The results of the one rerouted path is compared to the original path, which

tells whether the resource 46 is faulty. *Id.*, col. 8 lines 51-55. Thus, once a resource has been found to be faulty or not faulty by routing around the resource, there is no need to rout around that resource a second time. Only when other resources are being tested is another set of fault-free resources used. (Abramovici, col. 9, lines 1-9.)

In contrast, claim 1 recites "*new test paths for testing a first routing resource,*" not just one test path as is used in Abramovici. Additionally, claim 1 recites "*wherein the new test paths test every combination of fan-in and fan-out resources that are programmably connectable to the first routing resource.*" These multiple combinations of different resources are not disclosed in Abramovici, which only discloses the use of a single set of fault-free resources to test a resource (e.g. 46).

For at least these reasons, claim 9 and its dependent claims are allowable over Abramovici.

Claim 9-20

Applicants submit that independent claims 9 should be allowable for reasons mentioned with respect to claim 1. As claim 9 is allowable, dependent claims 10-14 are allowable for at least the same rationale.

Claim 15

Claim 15 is allowable as Abramovici does not teach or suggest each and every element of claim 15. For example, claim 15 recites:

a statistical failure isolation (SFI) tool, wherein the SFI tool:

- (a) receives a file including a plurality of failed test patterns that generated erroneous results when test values were applied to a set of failed test paths, wherein a test pattern includes program bits that define how routing resources on the programmable integrated circuit are connected to form a test path;*
- (b) determines routing resources along each failed test path;*
- (c) calculates a total number of occurrences of each resource in the failed test paths received in the file, at least one resource occurring in two failed test paths; and*
- (d) identifies a subset of the routing resources, wherein the subset comprises one or more resources having the highest counts of occurrences;*
and

an adaptive failure isolation (AFI) tool that subsequent to completion of (b)-(d) generates new test patterns including program bits that define new test paths for testing the subset of the routing resources.

Support for the amendments can be found, for example, at paragraphs 20 and 33 for (a), at paragraph 25 for (b), at paragraphs 26 and 29 for (c), at paragraph 30 for (d), and paragraph 33 supports using the AFI tool after completion of (b)-(d).

i. Abramovici does not receive a plurality of failed test patterns in single file

Rather than receive a list of failures, Abramovici discovers failures one test at a time, and trouble-shoots each discovered failure upon discovery. Specifically, "[w]hen the fault status data indicates the detection of a fault in one of the testing regions 19 in the self-testing area 16, roving of the self-testing area 16 is temporarily interrupted." (*Abramovici*, col. 7, lines 8-10.) Each time a failure in a region is detected, the testing halts, and the system trouble-shoots the failure to identify the faulty resource that caused the failure. Only after a new test is performed is another test result received. Thus, the failed test patterns are not received together as a file. Accordingly, Abramovici does not teach or suggest "receiving a file ... of failed test patterns," as recited in claim 1.

ii. Abramovici does not count occurrences of a resource in failed test paths

Abramovici identifies a failure when a fault status has been detected. (*Id.*, col. 7 lines 8-10.) Abramovici then pinpoints a fault through a series of additional tests that minimize a region of a group of resources that include the failure. (*Id.*, col. 7 lines 17-22 and FIGS. 4-6) Figures 5 and 6 show how the suspect group of resource 32 is subdivided through comparative testing into smaller separate groups 32a and 32b for further testing. (*See Abramovici*, col. 7, lines 17-44.) Although faults are detected, Abramovici does not mention a total number of occurrences of each resource in the failed test paths.

Accordingly, Abramovici does not teach or suggest a tool that "calculates a total number of occurrences of each resource in the failed test paths received in the file," particularly for "at least one resource occurring in two failed test paths" as recited in claim 15.

iii. Abramovici generates new test paths prior to identifying a minimized region, and not subsequent

As described above, Abramovici discloses a process of subdivision until the region of the group of resources under test is minimized (e.g. region 32a). (Abramovici, col. 7, lines 37-40.) In order to subdivide the area into smaller groups, Abramovici discloses further comparative testing. (Abramovici, col. 7, lines 22-40.)

At page 3 of the Office Action mailed March 1, 2007, the Office Action asserts that the comparative testing identifies a subset that occurs most frequently. However, such comparative testing with new test patterns is necessary to minimize a region, and thus occurs prior to generating new test patterns.

In contrast claim 15 recites an SFI tool that "(d) *identifies a subset of the routing resources, wherein the subset comprises one or more resources having the highest counts of occurrences,*" and an AFI tool that "subsequent to completion of (b)-(d) *generates new test patterns.*"

For at least these reasons, claim 15 and its dependent claims are allowable over Abramovici.

Rejection under 35 U.S.C. § 103(a), Abramovici

Claims 4, 6-8, 11, 13, 14, 16, 18-20, 23, and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Abramovici. Applicants submit that dependent claims 4, 6-8, 11, 13, 14, 16, 18-20, 23, and 24 are allowable for at least the same rationale as independent claims 1, 9, and 15 as stated above.

CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance and an action to that end is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 415-576-0200.

Respectfully submitted,

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